REMARKS

Claims 1-42 are all the claims pending in the application. Applicants respectfully request that the Examiner reconsider and withdraw the rejections in light of the following.

Oath/Declaration

Applicants thank the Examiner for pointing out the typographical error in the Oath. A duly executed oath with the correct prior U.S. Application number is being provided under separate cover.

Rejection of Claims 1-21 under 35 U.S.C. § 112, 1st Par.

Applicants respectfully traverse the § 112, 1st Par. rejection. The specification clearly discloses preferred embodiments of the claimed methods which show that the inventors had possession of the claimed invention at the time the application was filed. The discussions of these embodiments would enable one of skill in the art to practice the claimed invention. For example, representative embodiments of the independent claims are described in detail in at least pages 13-20 of the application. Applicants have set forth below, citations to non-limiting examples in the specification that evidence possession of the invention and would enable one of skill to practice the claim elements.

- At least one embodiment of the claimed *storing information of cultural or natural features in an area of the ground along and to the sides of a movement path* is described in the section on Area Correlation, beginning on page 14. Examples of the storage are given in Figure 5 and further explained in Figure 7.

- At least one embodiment of the claimed *using said ATWD during movement to obtain information of said features along and to the sides of said movement path* is described beginning at the bottom of page 7 and continuing through page 13. The electromagnetic wave considerations described may be converted by well known means to cover all ATWD sensors.
- At least one embodiment of the claimed *comparing said stored information with said information obtained by ATWD to determine successive different match points representing different ground locations* is described starting in the third paragraph of page 15 and amplified in Figures 6 and 7.
- At least one embodiment of the claimed *determining the range and range rate of each of said match points* is described beginning halfway down page 16 (Range/Range Rate Measurements Integrated Into Kalman Filter) and amplified in Figure 7.
- At least one embodiment of the claimed *determining the vehicle's location and velocity based on repetitive range and range rate measurements of said match points* is described on pages 16 and 17 and graphically illustrated in Figure 7.
- At least one embodiment of the claimed *supplementing the accuracy of said vehicle location and velocity determination with information from at least one of an additional navigation unit* is described in the last paragraph of "C" on page 17.
- At least one embodiment of the claimed *using said range and range rate in the navigation or state vector measurements of said vehicle* are described on page 17 and

illustrated in Figure 7. Examples of its use are given at the bottom of page 19 continuing into page 20.

- At least one embodiment of the claimed *dynamically creating a reference scene from all or a subset of said information* is described on page 20. Details of reference scenes are in "B. Area Correlation" beginning on page 14 and Figure 5.
- At least one embodiment of the claimed *locally storing said reference* is described beginning at the bottom of page 19. Details of storage are in "B. Area Correlation" beginning on page 14 and Figure 5.
- At least one embodiment of the claimed *using said ATWD after a time delay to again obtain information of the same said reference scene* is described beginning at the bottom of page 19.
- At least one embodiment of the claimed *comparing said stored information with said information obtained by said ATWD to determine reference scene match points representing different vehicle locations* is described beginning at the bottom of page 19.
- At least one embodiment of the claimed *determining the range and range rate of said matach points in both sets of information* is described beginning at the bottom of page 19.
- At least one embodiment of the claimed *using said range and range rate and the changes in range and range rate over said time in the navigation or state vector measurements of said vehicle* is described beginning at the bottom of page 19.

Applicants note that college electrical engineering undergraduate courses in Traveling Wave Engineering provide the necessary knowledge to allow conversion between the electromagnetic

equations provided and those describing sensors using acoustics (sonar) , mechanical, and thermal sensors. A typical textbook used in such courses is Traveling Wave Engineering by Richard K. Moore and published by McGraw-Hill Book Company (copyright 1960, Library of Congress Card Number 60-9852, ISBN: 0070429804).

Rejection of claims 22-24, 29, 34-36 as being anticipated by Bhanu

Applicant has amended these claims for clarification and respectfully traverses the rejection of Claims 22, 29, and 34. The Examiner contends that Bhanu et. al. teaches the use of an active traveling wave device that obtains information during movement along the path (citing col 1:6-23 at least).

While Bhanu does disclose both passive and active sensors, Bhanu relies primarily on the passive sensors and only selectively uses the active laser sensor for pin-pointed objects. Abstract ("The system is a maximally passive obstacle detection system that makes selective use of an active sensor."). The amended claims require that the ***active*** device obtain, for example, range and range rate information that is used to determine a three-dimensional position and velocity. Bhanu does not use an ***active*** device to determine three-dimensional position and velocity.

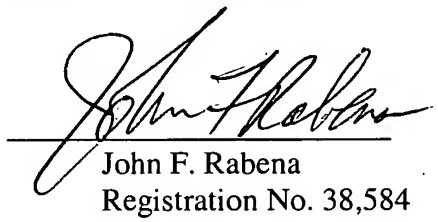
Bhanu's use of an active sensor is explained at [5:18]: "The use of a simple (i.e. circular scanning) laser range sensor 52, whose scan pattern is centered around the FOE [Focus of Expansion – also known as the inertial flight path], is for the purpose of detecting only small obstacles that lie within the vehicle's direction of travel." Applicant notes that the laser directly measures the range in only one arbitrary dimension, precluding the determination of vehicle position or velocity except it's component along that single arbitrary axis. Bhanu does not teach,

nor does he envision the non-trivial extension of determining 3-dimensional position and velocity from ***active*** traveling wave measurements of world objects while discriminating and disregarding transient or moving objects.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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